



ଓଡ଼ିଶା ରାଜ୍ୟ ମୁକ୍ତ ବିଶ୍ୱବିଦ୍ୟାଳୟ, ସମ୍ବଲପୁର, ଓଡ଼ିଶା  
**Odisha State Open University, Sambalpur, Odisha**  
Established by an Act of Government of Odisha.

## **Syllabus for Diploma in Computer Application (DCA) (Effective from Academic Year 2022-23)**

### **Programme Objectives:**

DCA programme aims at providing fundamental knowledge and skills of computer basics, file handling, data structure and programming language. After completion of the programme students will become ready for jobs in IT industry or they can start their own computer farm.

- ✚ The programme emphasizes the application of software technology to solve mathematical, computing, communications / networking and commercial problems.
- ✚ This aim of Diploma is to develop dynamic computer professionals in short time (01 year).
- ✚ The programme covers all aspects and basics in Computer Application.
- ✚ The DCA program imparts scientific, practical and technical knowledge to its learners about various computer tools that are used in day to day life.
- ✚ The applications and the programs taught make tasks simpler and provide ease of use to its users.

### **Programme Outcomes:**

After the completion of this programme, learner will have the basic and advance knowledge of Computer Fundamental and Microsoft Office software and apart from that he/she will be able to design decent websites.

- ✚ It will equip the learners with skills required for designing, developing applications in Information Technology.
- ✚ Learners will be able to learn the latest trends in various subjects of computers & information technology.
- ✚ Able to provide socially acceptable technical solutions to real world problems with the application of modern and appropriate programming techniques.
- ✚ Design and develop applications to analyze and solve the computer science related problems.
- ✚ The Diploma is aimed with a computing background and provides a detailed coverage of the key Concepts and challenges in data and resource protection and computer software security.
- ✚ To expose the learners to open Source technologies so that they become familiar with it and can seek appropriate opportunity in trade and industry.
- ✚ Graphic Designing.
- ✚ Web Designing.
- ✚ Digital Marketing.

## Highlights of the Programme:

**Duration of the Course** – Minimum: 01-year, Maximum: 02 years.

**Conduct of Classes:** Weekend for 2 hours of theory and 3 hours of practical (preferably on Sundays).

**Eligibility Criteria:** +2 or Equivalent

**Evaluation Methodology**-Based on Assignments (theory+ practical), Term end Examinations (Theory + practical) and Project work (viva voce + Report) Course Coverage – Theory, Practical and Project Work.

**Target Group:** Learners already enrolled in +3 and PG

**Pedagogy:** The Course shall be taught through the interactive, Self-guided Learning Materials, OERs as reference materials, Week-end Counselling Classes, Video Lectures, Project Work.

## Programme Structure

| DIPLOMA IN COMPUTER APPLICATION |  |           |
|---------------------------------|--|-----------|
| Course Code                     | Course Code                                  | Credits   |
| <b>Semester-1</b>               |  |           |
| CSP-40                          | Computer Fundamentals                        | 4(2+2)    |
| CSP-41                          | Office Automation (Word, Excel, Power Point) | 6(4+2)    |
| CSP-11                          | Data Communication & Networking              | 6(4+2)    |
|                                 | <b>Total Cumulative Credits</b>              | <b>16</b> |
| <b>Semester-2</b>               |  |           |
| CSP-42                          | Web Design (HTML, CSS, XML, Java Script)     | 4(2+2)    |
| CSP-43                          | Database Management System                   | 4(2+2)    |
| CSP-44                          | Application Development Using PHP            | 4(2+2)    |
| CSPP-01                         | Project                                      | 4         |
|                                 | <b>Total Cumulative Credits</b>              | <b>16</b> |
| <b>GRAND TOTAL CREDITS 32</b>   |  |           |

# SEMESTER 1

## Computer Fundamentals (CSP-40)

### Block-01(Computer Basic with Number System)

#### UNIT-01(Introduction of Computer)

Introduction, Definition, Characteristics of Computer, Functions of computer, Application of computer, Classification of Computer, Generation of Computer, Computer Memory Unit, Components of a computer (Board Overview): Input Unit, Processing unit (memory Unit, Control Unit, ALU), Output Unit, Components of a computer (Detailed Overview): SMPS, Motherboard (North Bridge, South bridge, Chipset, 20 pin ATX power connector, CMOS, Ports and other connected devices)

#### UNIT-02 (Number System)

Definition, Types of Number System (Decimal, Binary, Octal, Hexadecimal), Number Conversion: Decimal to Binary Conversion, Decimal to Octal Conversion, Decimal to Hexadecimal Conversion), Binary to Octal Conversion, Binary to Hexadecimal, Hexadecimal to Binary, Hexadecimal to Octal, octal to Binary, Octal to hexadecimal, negative number conversion.

### Block-02 (Fundamental Concept of Windows and Linux)

#### Unit-03 (Windows Operating System)

Introduction, S/W and its types, Operating System Concepts, Function of Operating System, Classification of OS, OS Benefits

**Windows:** Windows OS, versions of Windows OS, Windows 7 OS, My Computer, Device Manager, Remote Setting, System Protection, Map Network Drive, Control Panel.

**File and Folder Management in Windows 7:** create a directory/folder, How to change to a directory/folder, Creating a file in a directory/folder, Make the file read only, Make the file hidden, Editing a file in a directory/folder, Renaming a file in a directory/folder, How To Delete a file in a directory/folder, Listing the files in the directory, Copy a file from one directory /folder to the other, Deleting all files from a directory/folder, Deleting a directory/folder

**Installation Process:** Formatting a hard disk and fresh installation of Windows 7.

#### Unit-04 (Linux Operating System)

Introduction, Linux Installation Process, Directory Structure, working with Linux, Linux GUI, Linux terminal mode, Trash, Basic Commands in Linux.

**File and Folder Management in Linux:** create a directory/folder, How to change to a directory/folder, Creating a file in a directory/folder, Make the file read only, Make the file hidden, Editing a file in a directory/folder, Renaming a file in a directory/folder, How To Delete a file in a directory/folder, Listing the files in the directory, Copy a file from one directory /folder to the other, Deleting all files from a directory/folder, Deleting a directory/folder

# Office Automation (CSP-41)

## Block-01(MS-Word)

### Unit-01(Starting MS Word)

**Introduction:** Basics of MS-Word, Tools(Status bar, Title bar, Help, Ruler bar, Dialog box launcher, Document area, Zoom control, Quick access bar, View Buttons, File Tab, Ribbon), Tabs(Home, Insert, Page Layout, Reference, Mailings, Review, View, Design, Layout), Creating a new word document, Opening an existing document, Editing and saving a document, Text Alignment, Formatting Text, Find, Advance find and replace, Formatting page, margins, page size, portrait and landscape.

### Unit-02 (Symbols and Pictures)

**Insertion:** Inserting a Picture, Inserting a clip art, inserting shapes, Inserting smart art, Inserting charts, Inserting Equation, Inserting Symbol, Use of Bullets.

### Unit-03(Tables)

**Tables:** Basics, Table Creation, table manipulation: Using and manipulating tables, inserting / deleting of rows and columns, sorting tables.

### Unit-04(Working with header, footer)

Working with headers, footers and page numbers, Changing character width and line spacing, Print a document, Copy and moving text between two different documents, Typing more than one language in the same text.

### Unit-05 (Shortcuts in MS Word)

**Shortcuts:** Shortcuts for various activities in MS Word

## Block-02(MS-Excel -Vol-I)

### Unit-01(Starting MS-Excel)

**Introduction, definition,** Understand the MS-Excel Screen: Tabs, Entering to MS-Excel, Creating a new excel workbook, creating an excel worksheet, working with Excel worksheet (formulas, Data filtering, Data sorting, Using ranges, Data validation, Using styles, Using themes, Using templates, Using macros).

### Unit-02 (Working with Graphics)

Add and delete graphics (Picture, Clip Art, Shapes, Smart Art and Word Art)

### Unit-03(Formatting a Worksheet)

**Formatting a Worksheet** (Adjusting margins, Page orientation, Setting header and footer, Inserting page breaks, Setting background, Freeze panes), Conditional formatting, Format cell (Format Number, Alignment, Font, Border, Fill), Text Decoration.

### Unit-04(Charts and other Controls)

Working with Charts (Create, manipulation), Zoom in Out, Special Symbols, Comments (insert, view, Edit, delete, previous and next comment, show comment), Adding Textbox, Undo Changes.

## **Block-03(MS-Excel -Vol-II)**

### **Unit-05(VLOOKUP and HLOOKUP)**

Basic fundamental of VLOOKUP and HLOOKUP with example

### **Unit-06(Printing, translating and Workbook security)**

Printing worksheets, Translate worksheet, Email workbooks, Workbook security (protect worksheet, protect workbook).

### **Unit-07(Data Table and Pivot Table)**

Working with Data tables, Pivot tables and its uses

### **Unit-08 (keyboard Shortcuts)**

**Keyboard shortcuts:** Working with Basic shortcuts in MS-Excel

## **Block-04(MS-PowerPoint)**

### **Unit-01**

**Introduction:** Basics of MS-Word, Tools ( File tabs, Home, Insert, Design, Transition, Animation, Slide show, Review, View, Format)

### **Unit-02**

Working with Textboxes, Working with Slides, working with slide notes, working with slide bar, working with sections, working with outlines

### **Unit-03**

**Features of Power Point:** Presentation views, setting presentation background, Cut and Paste Operations, Copy and Paste Operations, Edit PowerPoint Presentation, Content Translation, Set Language Type, Duplicating Content, Special Characters,

### **Unit-04**

Slides Zoom in-out, Font Management and Text Decoration, Paragraph Indentation, Set line spacing, Borders and Shading, Using slide master to create design template, Manage a picture on a slide, Working with shapes on a slide, Adding audio and video to a slide, Working with charts on a slide

### **Unit-05(Sharing a Presentation)**

Convert PowerPoint to PDF, Convert PowerPoint to Video, Create an Image from PowerPoint, Print a PowerPoint, Broadcast PowerPoint presentation.

# **Data Communication & Networking (CSP-11)**

## **Block-01**

### **Unit-01(Fundamentals of Data Communication and Computer)**

Introduction, Data and Information, Data Communication, Data Representation, Data Transmission Modes, Computer Networks. Network Topology (Bus topology, Star topology, Ring topology, and Mesh topology), Categories of Networks (LAN, MAN, WAN), Protocols, and Standards in Networking

### **Unit-02(Network Reference Model)**

OSI Model, TCP/IP Model, Addressing in TCP/IP.

### **Unit-03(Transmission Media and Network Devices)**

Transmission Media and its Categories, guided Media, Comparison between Twisted Pair Cable, Co-Axial Cable and Optical Fiber, Unguided Media, Network Devices: Hubs, Switches, Bridges, Repeater, Router, Gateway.

## **Block-02(Physical and Data link Layer Functionalities)**

### **Unit-01(Analog and Digital Signals)**

Data and Signals, Analog Signal, Digital Signal, Types of Channels, Transmission of digital Signal, Bandwidth of Signal and Channel

### **Unit-02(Encoding)**

Signal Encoding, Synchronization, Digital data to digital Signal, Analog Data to analog Signal Conversion.

### **Unit-03(Multiplexing and Switching)**

Multiplexing, FDM, TDM, CDM, WDM, SDM, Switching, Circuit Switched and Packet Switched Networks, Comparison between Circuit Switching and Packet Switching

### **Unit-04(Data Link Layer protocols)**

Data Link Layer Services, Common Data Link Layer Protocols, Token Ring / IEEE 802.5, Medium Access Control (MAC), Random Access Protocols, Controlled Access Protocols, Channelization (FDMA, TDMA, CDMA), Physical Addressing, Error Detection, Identifying the Encapsulated Data, Framing, Flow Control, Error Control, Congestion Control

## **Block-03 (Network Protocols and Security)**

### **Unit-01(Network Layer Protocols)**

Network Layer, Internetworking, Internet Protocol (IP), and IPV4, Internet Control Protocol (ARP, RARP, ICMP, and IGMP)

### **Unit-02 (Transport Layer Protocols)**

Transport Services, Introduction to TCP, TCP Segment Header, TCP Services, Introduction to UDP, UDP Segment Structure, UDP Services

### **Unit-03 (Application Layer Protocols)**

Client Server Model, Bootstrapping Protocol (BOOTP), Hypertext Transfer Protocol (HTTP), HTTP Transaction, SMTP (Simple Mail Transfer Protocol), Multipurpose Internet Mail Extensions (MIME), Post Office Protocol (POP), Domain Name System (DNS), Telnet (Terminal Network), File Transfer Protocol (FTP)

### **Unit-04(Internet and its Services)**

History Of The Internet, How Internet Works?, Addressing Scheme in the Internet, Internet Service Providers , World Wide Web (WWW) , Services Provided By The Internet, Applications Of Internet

### **Unit-05(Network Security)**

Types of Security (Application Security, Computer Security, Data Security, Information Security, Network Security), Need of Security, Security Services (Confidentiality, Integrity, Availability, Authentication, Non-Repudiation, Access Control), Firewalls, Malware, Types of Malware, Security Countermeasures, Antivirus Software.

# **SEMESTER 2**

## **Web Design (HTML, CSS, JavaScript, XML) (CSP-42)**

### **Block-01 (HTML)**

#### **Unit-01**

Introduction of HTML, Writing my first HTML Page, Basic tags used in HTML, Elements In HTML, Attributes In HTML, Formatting In HTML, Meta Tags and their use, Commenting a HTML Code, Images and incorporating images, working with Tables, Working with Lists, Working with hyperlinks, Frames and frame management, Working with Iframes, Working with Block elements.

#### **Unit-02**

Background images, Coloured text and coloured background, working with fonts, Form designing and Form Management, Using Multimedia inside HTML, Marquee Tag, Headers, Working with Layouts, Role of Tags in Html, Attributes in Html, Event Handling, MIME Media Types.

### **Block-02 (CSS)**

#### **Unit-03**

Introduction of CSS, CSS Syntax, CSS Selectors, Ways To Insert CSS, Background image handling, Background colour management using CSS, Text management using CSS, Font management using CSS, Managing Hyperlinks using CSS, Managing Lists using CSS, Designing Tables using CSS, Working with the BOX Model, Designing Borders using CSS, Designing Outline using CSS, Setting Page Margin using CSS.

#### **Unit-04**

Padding using CSS, Setting Display Using CSS, Setting Width And Max Width using CSS, Setting Position using CSS, Setting the Float Property using CSS, Inline Block property, Horizontal Alignment in CSS, Working With Combinators, Working with Pseudo-class, working with Pseudo-elements, Creating a navigation bar, Working with images, Working with Attribute selectors.

### **Block-03 (Java Script)**

#### **Unit-05**

JavaScript Basics, JavaScript Syntax, Enabling JavaScript in Browsers, Placing JavaScript, Variables, Operators, Conditional Statement(if, if else), Switch case, Loops(while, do while and for loop), Functions, Events and event handling, Cookies, Page Redirection, Dialog Box(Alert, Confirm, prompt), void keyword, Printing webpage using JavaScript

#### **Unit-06**

Working with Objects, Numbers, Boolean, String in JavaScript, Arrays and Array Management, Working with Date, Mathematical operations, Regular Expressions, Document Object Model (DOM), Errors and Error Handling, Client Side Validation, Animations in Webpages, Multimedia in Webpages, Image Map.

# Database Management System (CSP-43)

## Block-01

### Unit-01

**Introduction:** Data and Information, Record, File, File oriented System, Databases, Database System and its Characteristics, Database Administrator (DBA), Other Users of database, Database Languages (DDL, DML).

### Unit-02

**Database System Architecture:** Schema, Subschema, Instance, Three Tier Architecture of database, Data Independence, Mappings, Types of Database.

### Unit-03

**Data Models:** Data Models and its Types (Object Based Data Models, Record Based Data Models), Constraints.

### Unit-04

**ER-Model:** Entity, Attribute, Keys, Relationship, ER Diagram Notations, Conversion of ER diagram to Relations.

## Block-02

### Unit-01

Relational database Overview, Relational Languages (Relational Algebra, Relational Calculus), Operation of Relational Algebra, Join, Minus, Translating SQL Queries into Relational Algebra, Division Operation.

### Unit-02

Procedural and Non procedural Query Language, Codd's Rule, introduction to SQL, Data Types in SQL, Operator, DQL, DDL, DML, DCL, TCL, Constraints in SQL.

### Unit-03 (Functional Dependency)

Database Dependencies (Functional Dependencies, Trivial Functional Dependencies, Full Functional Dependencies, Transitive Dependencies, Multi-valued Dependencies), Importance of Dependencies, Study of Functional Dependency, Basics of Functional Dependency, Axioms Rules, Trivial Functional Dependency, Why FD Is Important In Database Design, Characteristics of FD in Normalization, Functional Dependency Diagrams (FDD), Full Functional Dependency (FFD), Redundant Functional Dependencies, Closures, decomposition, Properties of Decomposition

### Unit-04 (Normalization)

Database Normalization, Need of Normalization, Multi-valued Dependencies, Types of Normalization (1NF, 2NF, 3NF, BCNF, 4NF, 5NF)

## Block-03

### Unit-01(Transaction processing and concurrency control)

Transaction concepts, concurrency control, locking and Timestamp methods for concurrency control.

### Unit-02(Database Recovery System)

Types of Data Base failure & Types of Database Recovery, Recovery techniques.



# Application Development Using PHP (CSP-44)

## Block-01

### Unit-01 (Basics of PHP)

Introduction, Algorithm, Flowchart, Program, Programming Languages and its generation, OOPs Concept.

### Unit-02 (Introduction to PHP)

**PHP Basic** (installing Process of PHP (XAMPP)), Structure of PHP program, Write the first PHP program, Syntax, Variables, Constants, Echo and Print Command, Data Type, Array Data Type, Types of Array in PHP, Multi dimension Array, Object data Type.

**Operations:** Basics and types of operation in PHP.

## Block-02(PHP)

### Unit-03 (Control Statement in PHP)

**Condition Statement** (if Statement, if else statement, if else if else statement, Switch Statement), **Loop** (While, do While, for and for each Loop). Super global Variable.

### Unit-04 (Form Management)

**Form Design:** get and Post method, Working with Textbox, Text Area, Password, Check Box, Radio Buttons, Drop down Box, File, Submit Buttons, Reset, Button, data, date Time, Email, search, Tel, URL etc.

Working with \$Globals, \$Server, \$ENV, \$SESSION, \$COOKIE with Example. Form Validation, Form Navigation

## Block-03(Advance PHP)

### Unit-01 (Object Oriented Concept in PHP)

Introduction, Basics of OOP in PHP, Pillars of OOPS, Understanding Classes and Objects, PHP Class Properties and Methods, Static, Constants, Constructor and destructor, Magic Methods in PHP, Inheritance in PHP, Interface, Abstract class, Final, Polymorphism

### Unit-02 (File management and Exception Handling)

Introduction, what is File, File Formats supported by PHP, File Operations, File Permission. Error Handling in PHP, Exception Handling, try... catch and throw, Top Level Exception Handler, User Defined Exception Handler

### Unit-03 (Database Connectivity in PHP)

Introduction, Introduction to MySQL, What can MySQL do? Why MySQL use with PHP, Features of MySQL, Communication between PHP and MySql Server: Create a connect to the MySql server (mysql, mysqli (MySQL improved, pdo (PHP Data Object)), Create Database and Tables in MySql, Insert Data into MySql Server, Mysql SELECT Statement, Update MySql Records, Delete MySql Records, Example database access from Webpage.

## Project Work (CSPP-01)

Guideline will be available in website.